

Treatment Planning: Implications for Structure of the CPR

Kenric W. Hammond, M.D.

American Lake V.A. Medical Center/University of Washington
Tacoma, Washington 98493-5000

The work of developing a specification for treatment and care planning software reveals lacunae in current structural conceptualizations of the computer-based patient record (CPR). A written treatment plan is ubiquitous in psychiatric settings, highly structured, and in theory, ideally suited to computerization. Treatment and care planning are also prevalent in nursing, rehabilitation, and long-term care. Treatment plans justify treatment with clinical data, and document goals, methods, and treatment outcomes. Implementing computer-based planning has been more difficult than first thought because present CPR systems do not support data schemes suited for integrating treatment plans with the general patient record. The CPR for general medical care will advance when it can support a treatment plan. Gaps in current CPR design exposed by requirements analysis for a multidisciplinary, team-based treatment planning system are identified.

INTRODUCTION

For two decades, attempts to develop machine-assisted patient treatment and care plans have resulted in theoretically interesting, but limited systems. Computers can be readily programmed to write treatment and care plans. Despite evidence, though, that computer-aided planning improves patient outcomes and reduces costs (1), most systems have foundered. Barriers to success include user training, data entry burden and inability to transfer updatable plans between the many care locations utilized by chronically ill, mobile populations. Lack of transportability prevents recycling and continuing prior plans, and limits the contribution computerization can make to integrating care across a delivery network. This reinforces impressions that computer-based treatment plans, like their paper counterparts, are more relevant to hospital accreditation than to helping patients. Below we propose that much of the difficulty arises because the information in a treatment plan addresses is schematically complex and incompletely represented in most CPR systems. Using a psychiatric treatment plan as an example, we will show how the data representation requirements of a treatment plan are relevant to general medical

care. Accordingly, we suggest that information schemas suitable for treatment planning may increase the capability of CPR systems to promote evidence- and outcome-based general health care.

WHAT IS A TREATMENT PLAN?

Mental health and nursing have been the chief focus of computer-based planning systems for at least three reasons. Because the content and form of plans tends to be explicitly defined in accreditation standards, designers have had a structure to work from. Second, because the document aims to coordinate activities of a team, it offers the promise of improving efficiency. Third, with more theoretic than actual impact, is the appealing notion that written plans promote goal-oriented, outcome-based care.

A formal treatment plan consists of a summary statement of problem titles and supporting symptoms; treatment goals; actions planned; names of parties responsible for taking actions; and identification of individualized outcome assessment parameters. The present Joint Commission on Accreditation of Health Care Organizations (JCAHO)-mandated format for Mental Health treatment plans borrowed guidelines laid out in the landmark *Wyatt v Stickney* decision, which established that patients incarcerated for mental symptoms had a "right" to treatment (2). An appendix to *Wyatt* furnished a formal outline adjudged adequate to certify responsible treatment. In practice, this standard applies to all psychiatric episodes in accredited facilities (3) and satisfactory mental health treatment planning is essential to hospital accreditation and insurance payment. Operationally, the treatment plan functions as contract to deliver specific services for defined problems. It lists the intended outcomes of treatment states how they will be measured. Given this, a researcher unfamiliar with actual practices might be forgiven for concluding that mental health treatment plans in JCAHO-accredited institutions would be a valuable information resource for outcome and cost-effectiveness studies. Unfortunately though, the impressive standard is usually met with a paper form, perhaps legible, but rarely revisited, lacking standardization, and of questionable scientific value.

An important aim of using computers to aid treatment planning is to bring the process closer to its theoretical promise, and yield quality management benefits. To do so, the barriers noted above must be surmounted. In recent years, formal planning processes have begun to extend to other areas, including long term care and workers' compensation. Pressures to manage health care costs have the potential to increase demand by third party payers for similar documents in general medical care. "Evidence-based" medical practice is another candidate for formal treatment planning too. If the treatment plan comes to general medicine, it will be useful for the CPR to be ready for it.

KEY DATA ELEMENTS

Because of its contents, the treatment plan has potential to be the organizing centerpiece of a patient information system. Figure 1 depicts the principal elements of a treatment plan and their linkages to CPR components. This relationship was identified in 1993 by a Department of Veterans Affairs (VA) working group charged with designing a generalizable mental health planning system to support continuous team-based care across a complex, geographically dispersed organization with many different levels of care. Additional aims were to promote adherence to practice guidelines for treating depressive disorders (4) and to assure compatibility with VA's CPR, in an evolving distributed computing environment. The resulting blueprint depended heavily on careful formal definition of data elements and use of controlled terminology, anticipating a need for standardized message packaging to transport updatable treatment plans between sites of care.

As Figure 1 illustrates, the resulting entity links to most aspects of a health care delivery organization. The treatment plan is a specialized "data view" that organizes many pieces of information system into a purpose-driven template for data entry and retrieval. The value of the assemblage exceeds the sum of its constituents because it is created with the explicit purpose of planning and monitoring treatment. Furthermore, this organization affords information about the administrative structure of care, tying the treatment team to a specific plan. Health care quality studies show that often the most correctable problems in health care are "system", not scientific problems. By linking clinical formulations of care episodes to delivery teams, this architecture affords access to the clinical and resource utilization profile of the team. This will permit better tracking of care

delivery processes and outcomes, with implications for managing teams' quality performance when the system is used consistently. Consistent use, though, will depend on ability to move the plan from one team to another as care progresses.

The following data elements of a treatment plan are especially important for CPR structure: Problems, problem Manifestations, Expected Outcomes, Interventions, Outcome Measures, and the membership, roles and purpose of the treatment team.

Problems

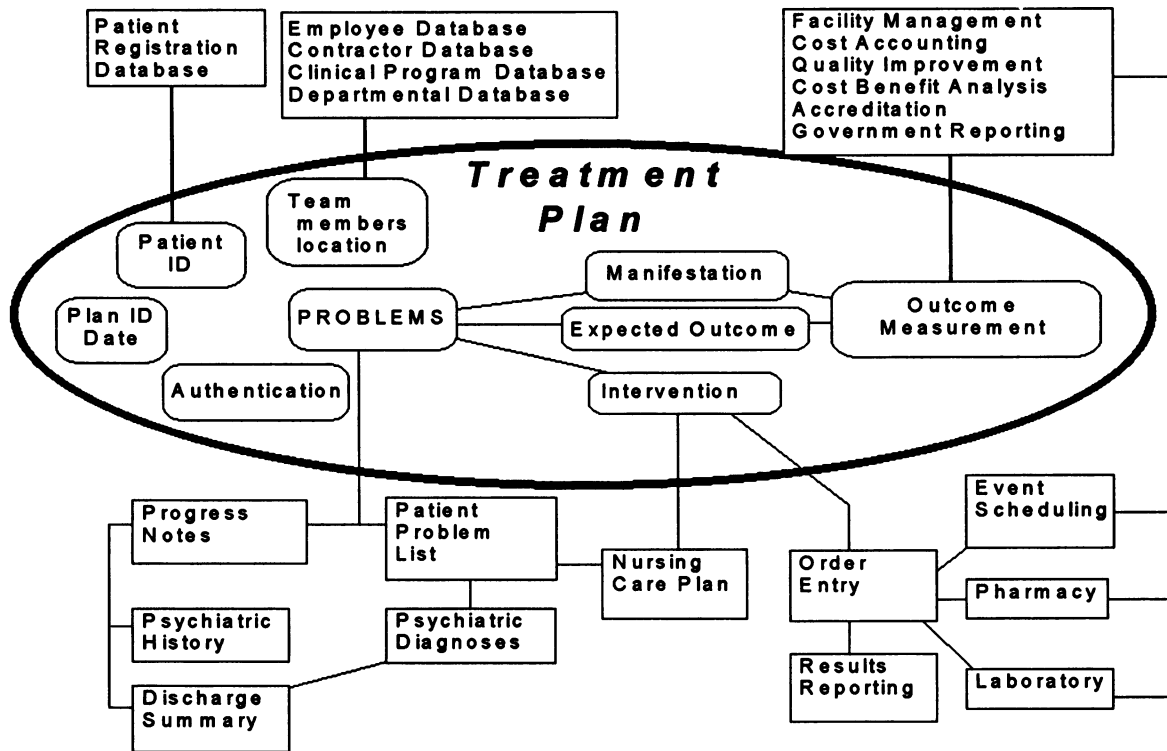
The VA CPR's common system for representing patient problems, accomplished in 1993, is indispensable for the treatment planning system (5). Problems are the basic units of a plan, and each may have an associated set of manifestations, expected outcomes, interventions, outcome measures and responsible team members. The VA CPR's problem list is designed to include *all* problems noted in *all* caregiving activity whether primary or specialty care, nursing, or allied health care. Any term used to *name* a problem for either the common problem list or a treatment plan must derive from VA's controlled vocabulary, Clinical Lexicon.

Problems from the common problem list are available for referencing in the treatment plan. If a new problem is identified in the course of developing a plan, it will be added to the common list. One practical consequence of this is that relevant problems will be less likely to be omitted when a treatment plan is created. *Elsewhere* in the CPR problem names will be available for use as progress note headers, diagnosis lists, clinical summary segments and tags for orders. This permits retrieval of a problem-indexed view of the patient's care process.

Manifestations

These sub-elements describing a titled problem are optionally drawn from the Clinical Lexicon, but there will be a preference for doing so. Examples of manifestations include historical information, objective findings, and symptoms. Some manifestations, e.g. hallucinations, or suicidal ideation for the problem "Psychosis", may be kept on the problem list as long as they are also represented in the Clinical Lexicon. For flexibility, free-text manifestations will be permitted, but may *not* be promoted to the status of a Problem. Because controlled terminology for manifestations is useful, initial versions of the treatment planner will create a need to add numerous

Figure 1. Position of the Treatment Plan in Organizational Data Flow



terms to the Lexicon. The lexicon is presently mainly derived from the Unified Medical Language System (UMLS). Version 6 of the UMLS metathesaurus (6) expands coverage of mental health terminology, but some gaps are expected.

Expected Outcomes

"Expected outcomes" was chosen instead of the customary "short and long-term goals" or "objectives" phrases because there is no consistent definition or usage of these terms. To provide a desired temporal dimension, an expected outcome may be paired with a date for outcome achievement. Expected outcomes include behaviors, health statuses, and accomplishment of procedures. Whenever possible, terms expressing the expected outcomes will be drawn from the Clinical Lexicon, but as with manifestations, free text will be permitted.

Interventions

Interventions are therapeutic, diagnostic and administrative actions. Some of these are available to the CPR's order entry system and will automatically be

Lexicon entries. Free text entries will be permitted. Each intervention or set of interventions may reference a team member responsible for its accomplishment.

Outcome Measures and Measurements

Test results, psychometric instruments, quantitative functional assessments, and true/false indications of completing an action may be used to characterize the patient's progress in treatment. This element has three components: the measuring tool used, a numerical or binary measurement, and the time of the measurement. An outcome measure may be linked to the entire plan, to a problem, or to a single expected outcome. As many *standardized* outcome measures as possible, e.g. the Beck Depression Inventory for monitoring mood disorders (7) will be referenced by the planning system. Use of standard measurements permits aggregation of outcome data over time when serial measurements are made, and as well as aggregate characterization of populations. Embedding suggested standard outcome measures in a plan transmitted to a new care location will be useful,

because it will encourage ongoing repeated measures amenable to trend analysis. As with interventions, some outcome measuring instruments may be orderable future events to be scheduled via the order entry system. We anticipate that the names of many standard psychometric measures will be fed into the Clinical Lexicon so that they can be referenced in standard fashion in the distributed CPR.

The Team

Because multidisciplinary treatment plans are developed and managed jointly by team members, standard representation of this clinical coalition is important. Teams contain members with positions and roles. Not infrequently, as team membership turns over, responsibility for a portion of the treatment task is inherited by a new member assuming the role of the one who has departed. In any specific instance of a plan, the team member's name will be listed where responsibility is assigned, but the role of that member will also be stored, so that subsequent updates of the plan can be guided by the role as well, e.g. "chaplain", "social worker", or "attending physician".

IMPLICATIONS FOR CPR ARCHITECTURE

The ASTM Standard Guide for Content and Structure of the Computer Based Patient Record (8) presently defines the properties of patient problems, and permits identifying a source vocabulary for the actual term used to name a problem. Manifestations are partially addressed in 1384's signs and symptoms, but the level of detail is sketchy and due for some revision. Expected outcomes and outcome measures are not specifically defined, but would fall under 1384's catch-all category "Patient Observations". The room for more explicit amplification of the properties of these elements is acknowledged, because of the direct bearing that outcomes have on quality management techniques. The properties of interventions defined in 1384 are consonant with the interventions in a treatment plan. However, the terminology of Current Procedural Terminology (CPT, which covers most *billable* interventions) is rather sparse for the specific interventions of a mental health team. Some of the interventions found in various controlled vocabularies for nursing care will be applicable. Finally, the concept of a treatment team is not yet defined in 1384, other than as an instance of a health care provider. Effort will be made to accomplish this in subsequent versions of the standard, because of the extent to which health care delivery in managed care environments is ac-

complished by teams, and because of the increasing need to provide them with information support in addition to doing so for individual practitioners.

Requirements for a treatment plan point out a need to define standard properties for problem manifestations, expected outcomes, outcome measures and teams in documents such as the ASTM 1384 Standard. Furthermore it will be useful to identify or develop controlled vocabularies capable of providing standardized terminology for instances of these concepts that occur in practice. This will facilitate transmission of updatable documents developed from standard term listings. Standard terminology will also better extract value from information stored in databases that unite clinical presentations, interventions and outcome measures. Although the first examples of this work come from mental health, similar support may eventually be useful in general medical care activities.

REFERENCES

1. Hammond KW, Prather RJ, Date VV, and King CA (1990). A provider-interactive medical record system can favorably influence costs and quality of medical care. *Computers in Biology and Medicine*. 20,4:267-279
2. Wyatt v. Stickney (1971), 325 F. Supp. 781, 785 and Wyatt v. Stickney (1972), Appendix A, 1972, F. Supp. 373, 379.
3. Joint Commission on Accreditation of Healthcare Organizations (1992). MHM, 1993 accreditation manual for mental health, chemical dependency, and mental retardation/developmental disabilities services. Joint Commission on Accreditation of Healthcare Organizations, Oakbrook Terrace, IL.
4. Depression Guideline Panel (1993). Depression in Primary Care: Detection, Diagnosis, and Treatment. Quick Reference Guide for Clinicians, No. 5, U.S. Department of Health and Human Services, Public Health Service, Agency for Health Care Policy and Research. AHCPR Publication No. 93-0552, Rockville, MD.
5. Lincoln MJ, Weir C, Moreshead G, Kolodner R, Williamson J (1994). Creating and evaluating the Department of Veterans Affairs electronic medical record and national clinical lexicon. Proceedings of the Eighteenth Symposium on Computer Applications in Medical Care, p. 1047, American Medical Informatics Association.

6. National Library of Medicine: UMLS Knowledge Sources, 6th experimental edition. 1995, U.S Department of Health and Human Services, National Institutes of Health.
7. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J (1961). An inventory for measuring depression. *Arch Gen Psychiatry* 4:561-571.
8. Committee E-31.19 on Computerized Systems (1994). A standard guide for content and structure of the computer-based patient record. Standard E1384-91 (94 revision), American Society for Testing and Materials, Philadelphia.